Inventor: Stephenall Serial No. 09/830,806

WHAT IS CLAIMED IS:

- 1. An apparatus comprising an imaging device, a range finder, and a processor capable of receiving and processing image and range signals to construct a three-dimensional image from said signals.
- 2. The apparatus according to claim 1, wherein the imaging device comprises a camera.
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- 3. (Amended) The apparatus according to claim 1, wherein the imaging device comprises a digital video camera.
- 4. (Amended) The apparatus according to claim 1, wherein the imaging device is capable of zoom functions.
- 5. (Amended) The apparatus according to claim 1, wherein the apparatus includes a display device to allow a user to view a target area using the imaging device.
- 6. (Amended) The apparatus according to claim 1, wherein the apparatus includes a pan and tilt unit for panning and tilting of the range finder and/or imaging device.
- 7. The apparatus according to claim 6, wherein the pan and tilt unit comprises a first motor for panning of the range finder and/or imaging device, and a second motor for tilting of the range finder and/or imaging device.
- 8. The apparatus according to claim 7, wherein the first and second motors are controlled by the processor.
- 9. (Amended) The apparatus according to claim 6, wherein the pan and tilt unit includes first and second digital encoders for measuring the angles of pan and tilt respectively.
- 10. The apparatus according to claim 9, wherein the outputs of the first and second encoders are fed to the processor.



- 11. (Amended) The apparatus according to claim 1, wherein the image is digitised.
- 12. (Amended) The apparatus according to claim 1, wherein the image comprises a plurality of pixels.
- 13. (Amended) The apparatus according to claim 1, wherein the image comprises a captured image.
- 14. (Amended) The apparatus according to claim 1, wherein the range finder comprises a laser range finder.

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Claims After Amendments



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- 15. (Amended) The apparatus according to claim 1, wherein the range finder is boresighted with the imaging device.
- 16. (Amended) The apparatus according to claim 1, wherein the apparatus includes a compass and an inclinometer and/or gyroscope.
- 17. (Amended) The apparatus according to claim 1, wherein the apparatus further includes a position fixing system for identifying the geographical position of the apparatus.
- The apparatus according to claim 17, wherein the position fixing system is a 18. Global Positioning System (GPS).
- 19. (Amended) The apparatus according to claim 1, wherein the apparatus is operated by remote control.
- 20. (Amended) The apparatus according to claim 1, wherein the apparatus is controlled by an input device.
- The apparatus according to claim 20, wherein the input device facilitates 21. operation of a particular function of the apparatus.
- 22. A method of generating a three-dimensional image of a target area, the method comprising the steps of providing an imaging device, providing a range finder, operating the imaging device to provide an image of the target area, and subsequently measuring the distance to each of a plurality of points by scanning the range finder at preset intervals relating to the points.
- A method according to claim 22, wherein the method includes the further steps of 23. obtaining a focal length of the camera; obtaining a field of view of the camera; and obtaining a principal distance of the camera.
- 24. A method according to claim 22 or claim 23, wherein the method includes the further steps of

digitising the image to provide a plurality of pixels within the digital image; calculating horizontal and vertical angles between a reference point in the image and each pixel;

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moving the range finder through the horizontal and vertical angles whereby the range finder is directed at each pixel in sequence; and actuating the range finder to obtain a range to the target corresponding to the position of the pixel.

25. A method according to claim 24, wherein the method includes the additional steps of

assigning x and y coordinates for each pixel within the image; correlating the range to the target with each pixel within the image; and calculating three dimensional coordinates of the pixels to reconstruct a three dimensional image of the target area.

26. A method according to claim 25, wherein the method includes the additional steps of

plotting each of the three dimensional points of the image; and superimposing a wire frame over the image connecting each of the three dimensional points.

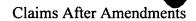
- 27. A method according to claim 26, wherein the method includes the additional step of superimposing the image on the wire frame to reconstruct a three dimensional image of the target area.
- 28. (Amended) A method according to claim 24, the method including the further steps of

obtaining a horizontal offset and a vertical offset between an axis of the camera and an axis of the range finder;

calculating the horizontal and vertical offsets in terms of pixels; calculating the difference between the horizontal and vertical offsets in terms of pixels and the x and y coordinates of the target pixel; and calculating the horizontal and vertical angles.

29. (Amended) A method according to claim 24, wherein the method includes the further steps of

providing the range finder and/or camera on a pan and tilt unit; providing angle encoders to measure the angles of pan and tilt of the unit; Inventor: Stephe all Serial No. 09/830,806



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A5 Cincluded instructing the pan and tilt unit to pan and tilt the range finder and/or camera through the vertical and horizontal angles;

measuring the horizontal and vertical angles using the encoders;

verifying that the angles through which the range finder and/or camera are moved is correct;

obtaining horizontal and/or vertical correction angles by subtracting the measured horizontal and vertical angles from the calculated horizontal and vertical angles; adjusting the pan and tilt of the range finder and/or camera if necessary; and activating the range finder to obtain the range to the target.